DOCUMENT RESUME

ED 367 593 SP 034 956

AUTHOR Gerber, Alex
TITLE Synergy, Holistic Education and R. Buckminster Fuller: Education for a World in Transformation.
PUB DATE 91
NOTE 16p.
PUB TYPE Viewpoints (Opinion/Position Papers, Essays, etc.) (120)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Educational Change; Educational Objectives; *Educational Philosophy; Elementary Secondary Education; Higher Education; *Holistic Approach; Integrated Activities; *Integrated Curriculum; *Role of Education; Self Actualization
IDENTIFIERS *Fuller (Buckminster); *Synergy

ABSTRACT

This pamphlet relates this quotation by R. Buckminster Fuller to the educational process: "To be optimally effective, undertake at outset the most comprehensive task in the most comprehensive and incisively detailed manner." The principle of synergy can be used to determine when something is "optimally effective." One example of how teachers can deliberately use the principle of synergy is by integrating the curriculum so that multiple skills develop simultaneously. To undertake a "comprehensive task," education should be approached in the context of holistic and global realities (thinking and acting from whole to parts). A "comprehensive and incisively detailed manner" for accomplishing this would begin by actively nurturing a holistic attitude orientation in educators, students, and policymakers. An interdenominational, unifying ethic that could inspire people worldwide would be valuing the whole. Holistic education is a key to unlocking the potential for self-empowerment. The call to educators and others is for a rapid evolution of consciousness, approaching ever deeper into "comprehensivity," which Fuller considered to be a deeper level of realization from which one can better perceive and shape reality. (Contains 27 reference notes.) (JDD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 367 593

SYNERGY, HOLISTIC EDUCATION AND R. BUCKMINSTER FULLER

Education for a World in Transformation

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

A. Gerber

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Alex Gerber

SB034956

BEST COPY AVAILABLE

Synergy, Holistic Education and R. Buckminster Fuller

Education for a World in Transformation

The most important fact about Spaceship Earth:
An instruction book didn't come with it.

R. Buckminster Fuller[1]

In these complex times, many people are feeling an increased commitment to the preservation and evolution of humanity. Unfortunately, for decades we have ignored the environmental, economic and cultural factors which are now wreaking havoc on Spaceship Earth. We have literally been undermining our own planetary life-support systems.

Fortunately, it appears that the world community is gradually becoming aware of itself as one inseparable whole. More and more people are beginning to recognize the need for a true transformation of consciousness, rather than the continued manipulation of statistics and intellectual concepts. But if we are to ensure our future on Earth, this growing awareness must be translated into effective worldwide action. Individually and collectively, Earth's people must become more harmonious—and quickly.

Yet what interdenominational, unifying ethic can inspire us to improve life *throughout* the planet? Of course we must formulate a plan of action to save Earth—but what plan would be most effective?[2] Consider this quotation by R. Buckminster Fuller (1895-1983; well-known for the geodesic dome and for the term *Spaceship Earth*): *"To be optimally effective, undertake at outset the most comprehensive task in the most comprehensive and incisively detailed manner."*[3]

If this statement is true, what makes it so? When is something *optimally effective?* What would comprise a *comprehensive task?* What would comprise a *comprehensive and incisively detailed manner* for accomplishing such a task? To help answer these questions, let us first consider the phenomenon of synergy.

Copyright © 1991 Alex Gerber. All rights reserved.

Synergy

Synergy is the principle whereby the behavior of a whole system is greater than the sum of its parts, a result not predictable from an examination of the individual parts. A good example of this is demonstrated in metallurgy. Individually the elements iron, chromium and nickel have certain characteristics. But when combined with carbon, manganese and other minor constituents, they make chrome-nickel-steel, an alloy much stronger and more durable than any of the original elements. Able to withstand enormous temperatures, this alloy is used in manufacturing jet engines—a discovery which has profoundly changed human reality, including our basic perception of time and space.[4] Buckminster Fuller wrote:

> It is a very popular way of thinking to say that a chain is no stronger than its weakest link. That seems to be very logical to us. Therefore, we feel that we can predict things in terms of certain minor constituents of wholes. That is the way much of our thinking goes. If I were to say that a chain is as strong as the sum of the strengths of its links, you would say that is silly. If I were to say that a chain is stronger than the sum of the strengths of all of its links, you might say that ... is preposterous. Yet that is exactly what happens with chrome-nickel-steel.[5]

There are many other examples which illustrate the power and applications of synergy. For a visual example of this fundamental principle of nature, consider the impact of the combined colors within a rainbow. A prime example in the classroom is cooperative learning—where children, working as a team, directly experience the value of synergy.

In theory, we could apply this principle in fulfilling all of our basic needs—healthy food, affordable housing, health care, renewable energy sources, and effective transportation and communications systems (some of the parts). Fuller demonstrates the type of innovative thinking required. One example is the geodesic dome—an ideal form of affordable housing which has an extremely high strength-to-weight ratio and uses only 1/50 the weight of materials needed for a conventional cubicle building.

By planning and acting from a broader perspective, which includes the needs of whole world as well as individual needs, we waste less, recycle more, and can optimize our use of human and nonhuman energy sources. Thus, by utilizing the principle of synergy, humanity can create an entirely new alloy—a truly viable planetary society.

We are presently experiencing the power of global synergy. Often, however, it has manifested in a detrimental form created through ignorance and misplaced trust. Most of humanity is still focused on short-term gains rather than the unity and viability of our whole

planet. This focus has created many complex conditions that are unfavorable not only to our environment but also to life itself.[6] Airborne chemicals are destroying the ozone layer. The clear-cutting of rainforests is contributing to the greenhouse effect while causing the extinction of unprecedented numbers of plants and animals. Aimed only at maximizing short-term profits, many agricultural practices are accelerating the loss of topsoil and groundwater while creating long-lasting toxic pollution. The list goes on and on.

Given the vast inertia of our negative environmental condition, we would be wise to take greater advantage of synergy—a powerful ally that is directly applicable in education, government and business, as well as in our personal lives.

How can educators and others best take advantage of synergy? By explicitly nurturing it—by focusing first on the whole system, and then the parts. This very process will *evoke* synergy and create effects greater than the sum of specific actions. One example of how teachers can deliberately use the principle of synergy is by integrating the curriculum so that the development of multiple skills (e.g., reading, math, history, spelling) occurs simultaneously. Life demands that education be interdisciplinary. When our focus is only on the specific parts, there are often so many that we miss the wholeness—we don't see the forest for the trees.

Even educators who are familiar with synergy may not be utilizing it in the classroom (or the board room) on a day-to-day basis. Just as one needs to understand (intuitively or otherwise) the principle of leverage in order to move something heavy with a lever and fulcrum, so we need to understand more about the generalized principle of synergy in order to work together most effectively.[7] We as a society have been creating and reinforcing our ecological and social catastrophes. But human values can change. ***Improved education can make the difference.***

Nature functions as a whole, integrated system. Since synergy is, by definition, "of the whole," we can align with nature most effectively by first considering the whole system and then progressing to the parts, not the other way around. This is why, in any domain of activity, it is optimally effective to *undertake at outset the most comprehensive task* and to address tasks comprehensively as Fuller suggests.

Holistic Education

Holistic refers to the functional relationship between a whole system and its parts. While this term may have already become a diluted buzzword (similar to the term *natural*), it is still the best description we have for this relationship.

Holistic education is unfragmented, *living* education which integrates all aspects of life. Rather than dwelling on ideology, statistics or historical debates, a holistic approach to education provides the *conceptual base* necessary for answering such key questions as "What kind of world do we want?" and "How should we be educating ourselves and our children?"

As we approach the year 2000, the comprehensive view of life implied in these questions must be embraced by educators. Unfortunately, most training programs are designed primarily to increase the teacher's database. Often the *philosophical base*, which underpins every aspect of an educator's work, has not been clarified for some time, if ever. This omission is a fundamental weakness in education today.

The people of Earth are crying out as never before for solutions which are *optimally effective*. But what *comprehensive tasks* can be identified? Because so many human activities are manifestations of our educational systems, educating ourselves comprehensively (holistically) is one activity which is within our control.

Although it certainly encompasses day-to-day teaching activities, holistic education cannot be constricted into a set curriculum or methodology.[8] Since holistic education is unfragmented, it encompasses the investigation of all subjects and issues in relationship to the whole of life. Proceeding from whole to parts, rather than the reverse, it helps develop an *intuitive attitude orientation*. Instead of just adding data, this conceptual shift helps create an atmosphere of self-empowerment, serving as a tool for discerning any issue.

Practicing holistic education requires a viewpoint quite different from that which has generally been encouraged in academia. It values "heart-knowing," the process of feeling and perceiving intuitively.[9] Thus, it is not accidental that certain terms used here—*living education, whole of life, whole to parts, attitude orientation*—are neither referenced nor defined objectively.

The holistic approach also encompasses rationalism, because there are indeed sound reasons for its use. In many cases, however, it transcends rationalism by trusting intuition as being closer to the mark than logical reasoning. For example, by the time we have scientifically proved the limits of Earth's life-support capabilities, we may have already exceeded them. Forests, lakes, coastal waters, many soil-based ecosystems and unprecedented numbers of species have already perished. Our atmosphere is already severely imbalanced. But if we begin to utilize our resources holistically, they need never become exhausted. Buckminster Fuller's World Game, the geodesic dome and "doing more with less" are excellent teachers of this principle.

Traditional Western education starts with the parts and rarely, if ever, progresses to the whole. One result of this approach is the infinitude of parts, the multitude of academic disciplines. In most

college catalogues, human knowledge is dissected into minute specializations. Such compartmentalization of knowledge is useful in some disciplines, but when it is the predominant approach (as observed, for example, in the physical sciences, social sciences and most teacher education programs), we often fail to appreciate that all-important reality called "the whole." On a planetary scale this short-sighted human behavior has resulted in cultural disintegration and environmental catastrophe.

Educators must come to view their work in the context of holistic and global realities. To many educators, however, this approach may not seem practical enough; they may resist examining such abstract philosophical concepts, preferring to look for external solutions in the form of traditional approaches to curricula (canned lesson plans, going by the book, etc.). This is to be expected, since the quest for objectivity has been the foundation of our entire educational background.

However, it is becoming clear that developing a tolerance for and appreciation of the abstract, including the value of a *holistic attitude orientation*, is the most practical step! When educators reward only traditional solutions, they are, in reality, refusing to recognize the value of the intuitive and subjective. Fuller often addressed this situation, teaching that much of the phenomena that affect our everyday reality exist only in invisible, subjective realms.[10]

For example, synergy—although very real—is intangible; like gravity, we see only its effects. Likewise, factors that contaminate our food, water and air are often imperceptible to all but the most sophisticated scientific instruments. So, too, are processes leading to diseases such as cancer and AIDS. Often such processes seem invisible because they occur so gradually. For example, we know that greenhouse gases and ozone depletion exist even though we cannot directly perceive such phenomena and try our best to ignore them. Chemical reactions that result in super-high-tech alloys and microchip advances are also unseen. Unfortunately, some of the negative side effects of their manufacturing processes are not so invisible.

Most of the electromagnetic realm is invisible except through scientific instruments, but it certainly affects every aspect of our lives. Similarly, just as the essence of healing, spirituality and love is felt rather than seen, "the whole" can only be perceived intuitively, beyond the five senses.

The foregoing examples illustrate that much of our everyday reality exists in dimensions which are invisible, subjective or abstract. I believe that this "multidimensionality" of reality must be explicitly recognized by educators as well as the general populace before our planetary declines can be reversed. But how can people overcome their dependency on solutions that are objective and easily quantifiable? Only by shifting to a *holistic attitude orientation*—a softer focus,

an all-encompassing mode of inquiry that is intuitive, interdisciplinary and cross-cultural.

When educators make this shift, many exciting developments ensue. Lesson plans and teaching methods start bubbling up from inside, becoming more intuitive and spontaneous. Education becomes more fun and exciting for everyone concerned. This is what a holistic paradigm shift is all about—growing numbers of people realizing that invisible and abstract factors are powerfully at work within themselves as well as the external world.[11]

But how will the holistic approach help solve the tough education issues facing society today—illiteracy, dropout rates, teacher and student burnout, crowded classrooms, testing fairness, funding, busing...?

First, it is essential for parents and educators to broaden their focus beyond the specific issues. Most often, taking a firm stand on a particular issue brings forth an equally firm antithesis. The tendency for point to produce counterpoint—taking sides on issues—has occurred consistently throughout history. Society has become conditioned into an oppositional, partisanship-oriented mindset. Just look at any newspaper.

Yet, if this polarization continues to self-propagate and we continue to foul our planetary home, human society cannot maintain its viability. Before we can arrest the destruction of Earth and begin thriving as a global society, we must start focusing our attention on unifying and healing, rather than opposition. To accomplish this, a shift by educators to a *holistic attitude orientation* is essential.

The practice of holism, which does not operate from an oppositional mindset, will reformulate our entire approach to solving the problems of education. The very nature of holistic education makes it uncombatable; it is nonpartisan by definition because it implies a viewpoint that embraces every viewpoint. It is a simple but powerful way of learning how to *see*. Therefore, holistic education can be a powerful and compassionate pattern for achieving common consensus and for personal and global evolution.

Recognizing the spiritual nature of life is the underlying basis of a holistic approach.[12] Since spirituality has been largely ignored by mainstream educators, it is fortunate that we now have more objective support for holism[13] as well as tools to help teachers develop holistic awareness. This is vital for successfully resisting charges of desecularization when introducing holistic concepts into mainstream education. Valuing the comprehensive (the whole), which is implicit in holistic education, will also provide us with nonpartisan values for education—creating a much-needed secular touchstone for distinguishing the relative merits of all teaching methods and curricula.

Some educators maintain that programs to enhance basic literacy should be the primary focus in educational reform, that teaching the

three Rs must be given top priority. But given our media-saturated society and eclectic styles of family and religious life, it is not always easy for children to learn that the "whole" exists. Of course the three Rs are important, but mastering them will not ensure or even encourage the development of a comprehensive free will. The unity of life on Earth may not be self-evident—***but it can be learned.***

A crucial variable in determining whether students experience holistic connections is the teacher's *attitude orientation*. When authentic emotional connections are forged between co-learners—students, teachers, parents, administrators—education becomes exciting again. When education is interpersonal and relevant to real life, discipline problems and boredom are minimized; student interest is spontaneously maintained. By exploring the connecting process, not just the individual fragments, the curriculum can literally come alive. As more of our educators are beginning to discover, helping learners to link their inner world with the unity of life is tremendously rewarding.

R. Buckminster Fuller

The author of more than 20 books, R. Buckminster Fuller dedicated his life to exploring our world from the whole to the parts and teaching about his discoveries. Despite the objective rationales to which he often referred, Fuller knew that "comprehensivity" comes primarily through intuition, that one must gain a sense of the whole in order to recognize the value of the parts. Unlike learning by rote, true comprehensivity emphasizes the necessity to go beyond one's current understandings—to get outside the infinitude of the parts.

To Fuller, the exact opposite of a specialist is not a generalist; he considered "comprehensivist" to be a further step—a deeper level of realization from which one can better perceive and shape reality. One thing that made Fuller's approach frustrating to some of his critics is that he worked "from the whole"—not inductively from within any particular context, but comprehensively from intuitive insight. His critics said, in effect: "This appears disconnected; he doesn't build on what came before. He is trying to reinvent the wheel and rediscover Einstein all at once." However, Fuller did invent a new wheel: Synergetic Geometry—Synergetics—and its multifaceted applications.[14] In fact, his discovery of certain practical applications of Einstein's work was acknowledged by Einstein himself.[15]

Although Fuller's artifacts and strategies for humankind's success—including the Spaceship Earth Dymaxion Map, the World Game, geodesic domes and many others[16]—are of tremendous importance, perhaps his greatest contribution occurs on other levels. According to E.J. Applewhite, Fuller's friend and collaborator on

Synergetics and *Synergetics 2*, "Fuller's primary vocation is as a poet. All his disciplines and talents—architect, engineer, philosopher, inventor, artist, cartographer, teacher—are just so many aspects of his chief function as an integrator."[17] "His philosophy was never a rationale for the domes, rather the domes were an attempt to explain his philosophy."[18]

Fuller produced a unified conception of reality (with both objectively and intuitively derived rationales) and a vital goal—a vision of our potential success as voyagers on Spaceship Earth. Always centered around perceiving, thinking and acting from "whole to parts," he provided an exquisitely coherent physical and metaphysical eyepiece for self-discovery. He gave this concept shape and he gave it voice—exemplified by his statement, *"To be optimally effective, undertake at outset the most comprehensive task in the most comprehensive and incisively detailed manner."* When educators put this single statement into practice, the world will vastly improve, synergistically.

Hugh Kenner, noted scholar and author, said that Fuller gave us a "system of coherencies ... for our space age navigating."[19] He wrote, "The crisis to which synergetics is pertinent is a crisis of popular enlightenment, popular faith. ...Metaphors, paradigms, these are our deepest needs ...."[20]

Fuller's work exemplifies the paradigm shift toward a more holistic conception of reality. This shift is already evident in such areas as "new" physics;[21] the use of visualization, biofeedback, acupuncture and other alternative healing techniques; alternative birth centers; and motivational and wellness programs in the business world.

Although the holistic approach is becoming more apparent in mainstream education, it certainly needs greater emphasis. Education systems which reflect the holistic nature of life must be adopted to help reverse the forces which are destroying our environment. We have been in a gestation period, but I believe that holistic education and attitudes will be much more widely understood and accepted within the foreseeable future.[22]

I am convinced that Fuller will become better recognized as a pivotal contributor in the world of contemporary education philosophy. He wrote:

> Humans are coming swiftly to understand they must now consciously begin to operate their space vehicle Earth with total planetary cooperation, competence, and integrity. Humans are swiftly sensing that the cushioning tolerance for their initial error has become approximately exhausted.[23]
>
> I am certain that none of the world's problems—which we are all perforce thinking about today—have any hope of solution except through total democratic

society's becoming thoroughly and comprehensively self-educated. Only thereby will society be able to identify and intercommunicate the vital problems of total world society. Only thereafter may humanity effectively sort out and put those problems into order of importance for solution in respect to the most fundamental principles governing humanity's survival and enjoyment of life on Earth.[24]

Your educational forces, if competently organized and instrumented, should stimulate the self clean-up. The politicians won't clean up; the only hope is through education.[25]

Metaware

meta-, 1. from the Greek meaning "beyond," "behind," and often denoting change, used in the formulation of compound words: *metaphysics.*

ware, *n.* **1.** usually **wares. a.** articles of merchandise or manufacture; goods: *a peddler selling wares.*[26]

Computer programs are known as software. Educational software can be designed to create curricula (holistic or otherwise). Yet, in classrooms, the curriculum functions more like hardware: the vehicle on which the program rides. True software—the real programming—is the teachers' *conceptual base,* manifested through the attitude and awareness with which she or he presents the material and brings it to life in the classroom. Since the terms *software* and *hardware* have already been universally defined, we can create a new label for this meta-program (the philosophical base which, articulated or not, always lies behind the software): ***Metaware.***

Metaware is the "ware" that is unaddressed in most educational settings as we approach the year 2000. Identifying this vital link underscores the need for most educators to reexamine and reformulate their philosophical underpinnings.

In conclusion, as we review the questions posed at the outset, it is important to remember that holism is, by definition, nonlinear. Therefore, it should not be surprising that the information presented here appears to overlap or reiterates the same basic points.

How do we know when something is *optimally effective?* This becomes self-evident when we understand and apply the principle of synergy. What would comprise a *comprehensive task* that educators and other individuals might undertake? We can approach education in the context of holistic and global realities (thinking and acting from whole to parts). What would comprise a *comprehensive and incisively detailed manner* for accomplishing this? We can begin by

actively nurturing a *holistic attitude orientation* in educators, students and policymakers—a practical measure that will help rekindle the lost vision for education.

What interdenominational, unifying ethic could inspire people worldwide? ***Valuing the whole.*** One powerful starting point would be to learn more about R. Buckminster Fuller and his multifaceted options for humankind's success. His philosophy is a meta-philosophy, a wonderful view-station for discerning the answers to the two key questions previously introduced: "What kind of world do we want?" and "How should we be educating ourselves and our children?"

Finally, what plan is best? One's own individual creation. Personal integrity and *self*-education are key ingredients in creating a common consensus with the power to effect vital change.[27]

We already live in the global age; there is no returning to the days of isolationism. So it is essential that holistic ideas and attitudes be emphasized not only in our own country, but throughout the world. Although holistic education, by itself, will not totally cure our educational, personal or planetary ills, it is a necessary and identifiable component of any long-term solution.

It has been said that peace between people is not possible until peace has been attained within. Holistic education is one key in that personal endeavor. Because holistic education is *education about education,* it is a golden key—a means of unlocking our potential for self-empowerment. The call to educators and others is for a rapid evolution of consciousness on this planet, approaching ever deeper into "comprehensivity."

NOTES

1 R. Buckminster Fuller with Jerome Agel and Quentin Fiore, *I Seem to Be a Verb* (New York: Bantam, 1970), front cover.

2 Even the mass media has begun to feature the need to save Earth. For example, see the 2 January 1989 *Time* cover story, "Endangered Earth," or the 1990 PBS television series, "Race to Save the Planet," hosted by Meryl Streep.

3 R. Buckminster Fuller, *Critical Path* (New York: St. Martin's, 1981), p. 251.

4 This example is from R. Buckminster Fuller in collaboration with E.J. Applewhite, *Synergetics: Explorations in the Geometry of Thinking* (New York: Macmillan, 1975), p. 6. (Also see note 14.)

5 Ibid.

6 "The Dark Side of Growth," a chapter in Fritjof Capra, *The Turning Point: Science, Society and the Rising Culture* (New York: Simon and Schuster, 1982), covers this well.

7 "Generalized principles" are described in *Critical Path* (see p. 432) and other works by Fuller.

8 However, there are many excellent holistic education resources, including works by and about R. Buckminster Fuller (also the Buckminster Fuller Institute, 1743 S. La Cienega Blvd., Los Angeles, CA 90035); World Game Institute, 3508 Market St., Philadelphia, PA 19104; The Robert Muller School, 6006 Royaloak Dr., Arlington, TX 76016; and Holistic Education Press, 39 Pearl St., Brandon, VT 05733-1007 (publishers of *Holistic Education Review* and *1990-1991 Guide to Resources in Holistic Education*). Robert Muller has formulated a World Core Curriculum (manual available from The Robert Muller School) and Buckminster Fuller has outlined a Design Science Curriculum (see *Utopia or Oblivion: The Prospects for Humanity*, Woodstock, New York: The Overlook Press, 1969). Readers are also encouraged to investigate the Montessori and Waldorf education philosophies.

9 Fuller recognized the crucial importance of intuition. This theme recurs throughout his work, especially in the book *Intuition* (1972; 2nd ed., San Luis Obispo, CA: Impact Publishers, 1983).

10 See Fuller, *Critical Path*, pp. 161 and 440, for examples.

11 Many excellent books have chronicled this shift; Capra's *The Turning Point* is one of my favorites.

12 Conversely, a holistic approach can help to clarify one's spirituality. *The Zen Teaching of Huang Po: On the Transmission of Mind*, translated by John Blofeld (New York: Grove Press, 1958), is an excellent book on this subject.

13 Prime examples include the work of R. Buckminster Fuller, physicists David Bohm (see note 21) and Fritjof Capra, molecular biologist Rupert Sheldrake, and Deepak Chopra, M.D. (author of *Quantum Healing: Exploring the Frontiers of Mind/Body Medicine* [New York: Bantam, 1989]), to mention only a few.

14 *Synergetics* is Fuller's name for the geometry of nature's coordinate system. See *Synergetics: Explorations in the Geometry of Thinking* (cited in note 4) and *Synergetics 2: Further Explorations in the Geometry of Thinking*, also by R. Buckminster Fuller in collaboration with E.J. Applewhite (New York: Macmillan, 1979). Nature's coordinate system: "The mathematically expressible system that governs the coordination of both physical and metaphysical phenomena. Set of

generalizations about the way systems are structured and able to cohere over time. Interplay of the principles describing spatial complexity with the requirements of minimum energy in the organization of natural structures." (From Amy C. Edmondson, *A Fuller Explanation: The Synergetic Geometry of R. Buckminster Fuller* [Boston: Birkhauser Boston, 1987], p. 283.)

15 See R. Buckminster Fuller and Anwar Dil, *Humans in Universe* (New York: Mouton, 1983), p. 43.

16 These and other Fuller artifacts and strategies are described in *Critical Path* and other books by and about Fuller.

17 E.J. Applewhite, *Cosmic Fishing: An Account of Writing Synergetics with Buckminster Fuller* (New York: Macmillan, 1977), p. 57. Applewhite says that Fuller described "poet" as "a very general term for a person who puts things together in an era of great specialization when most people are differentiating or taking things apart." Further, Applewhite writes, "For Fuller, the stuff of poetry is the patterns of human behavior and the environment, and the interacting of physics and design and industry."

18 Ibid., p. 7.

19 Hugh Kenner, Bucky: *A Guided Tour of Buckminster Fuller* (New York: William Morrow, 1973), p.11.

20 Ibid., pp. 300, 314.

21 For example, see works by Fritjof Capra. Also see David Bohm, *Wholeness and the Implicate Order* (1980; reprint, London: Routledge & Kegan Paul, 1981); Gary Zukav, *The Dancing Wu Li Masters: An Overview of the New Physics* (1979; reprint, New York: Bantam, 1980); and Fred Alan Wolf, *Taking the Quantum Leap: The New Physics for Nonscientists* (San Francisco: Harper & Row, 1981).

22 Fuller often addressed "gestation rates," which he defines as not only applying to biological entities, but to technology as well—the lag between the discovery or invention of something and its acceptance and employment by industry or society. See *Critical Path*, pp. 283, 433.

23 See R. Buckminster Fuller, *Earth, Inc.* (Garden City, New York: Anchor-Doubleday, 1973), p. 101.

24 See Fuller, *Critical Path*, p. 266.

25 See *R. Buckminster Fuller on Education*, edited by Peter H. Wagschal and Robert D. Kahn (Amherst: University of Massachusetts Press, 1979), p. 53.

26 Definitions adapted from *The Random House Dictionary of the English Language*, unabridged edition.

27 Toward the end of his life Fuller saw *integrity* "at the core of all he had been able to accomplish and central to what he now had to say." He saw the power of personal integrity as "a force in the world ... capable of steering humanity towards the realization of a world that truly works for everybody" (from a brochure titled "Integrity Day: A Meeting With Buckminster Fuller," 26 February 1983, p. 2).

14

Recycled paper

Alex Gerber, Ph.D., is an educator, counselor, consultant, author and musician living near Seattle, Washington. This booklet presents some of the material from his forthcoming book, *Tao in Education: The Whole Systems Approach*.

BEST COPY AVAILABLE

Gerber Educational Resources
P.O. Box 2997
Kirkland, WA 98083

BEST COPY AVAILABLE